WHAT IS CLAIMED:

1. A composite insulation material comprising:

a syntactic foam component and

a plurality of aerogel inserts embedded within said syntactic foam component.

2. The composite insulation material according to claim 1, wherein said syntactic foam component comprises an elastomeric matrix and a filler dispersed substantially throughout said elastomeric matrix.

3. The composite insulation material according to claim 2, wherein said elastomeric matrix is selected from the group consisting of silicone and rubber.

4. The composite insulation material according to claim 2, wherein said elastomeric matrix further comprises a plasticizer.

5. The composite insulation material according to claim 4, wherein said plasticizer is present in an amount by volume of between about 5 and about 50 percent.

6. The composite insulation material according to claim 4, wherein said plasticizer is polymethylsiloxane.

7. The composite insulation material according to claim 2, wherein said filler comprises a plurality of microspheres.

8. The composite insulation material according to claim 7, wherein said plurality of microspheres are present in an amount by volume of between about 10 and about 70 percent.

9. The composite insulation material according to claim 7, wherein said microspheres are selected from the group consisting of glass microspheres, plastic microspheres, and a combination of glass and plastic microspheres.

10. The composite insulation material according to claim 7, wherein said microspheres have a diameter of between about 20 and about 5,000 micrometers.

11. The composite insulation material according to claim 1, wherein said syntactic foam component comprises an elastomeric matrix and a

plurality of microspheres, wherein said elastomeric matrix comprises silicone and a plasticizer.

12. The composite insulation material according to claim 1, wherein said plurality of aerogel inserts are partially embedded within said syntactic foam component.

13. The composite insulation material according to claim 1, wherein said plurality of aerogel inserts are fully embedded within said syntactic foam component.

14. The composite insulation material according to claim 1, wherein each of said aerogel inserts comprises synthetic amorphous silica.

15. The composite insulation material according to claim 14, wherein said plurality of aerogel inserts are present in an amount by volume of between about 40 percent and about 90 percent.

16. The composite insulation material according to claim 14, wherein said plurality of aerogel inserts are non-uniformly embedded within said syntactic foam component.

17. The composite insulation material according to claim 14, wherein said plurality of aerogel inserts are uniformly embedded within said syntactic foam component.

18. The composite insulation material according to claim 1 wherein said composite insulation material has opposed first and second surfaces, the composite insulation material further comprising:

a first laminate layer substantially covering the first surface of said composite insulation material;

a second laminate layer substantially covering the opposed second surface of said composite insulation material; or

both the first and the second laminate layers.

19. The composite insulation material according to claim 18, wherein said first and second laminate layers are the same or different and each comprises a nylon/spandex laminating compound, a lycra laminating compound, or a neoprene rubber laminating compound.

20. The composite insulation material according to claim 18 further comprising:

a first adhesive layer between said first laminate layer and said first surface of said composite insulation material;

a second adhesive layer between said second laminate layer and said second surface of said composite insulation material; or

both the first and second adhesive layers.

21. The composite insulation material according to claim 20, wherein said first and second adhesive layers are the same or different and each comprises a silicone-based adhesive.

22. The composite insulation material according to claim 20, wherein said first and second adhesive layers each has a thickness of between about 200 and about 500 micrometers.

23. The composite insulation material according to claim 18, wherein each of said first and second laminate layers has a thickness of between about 200 and about 500 micrometers.

24. The composite insulation material according to claim 18 further comprising a fluid impervious membrane between said first surface and said first laminate layer.

25. The composite insulation material according to claim 18 further comprising a fluid impervious membrane between said second surface and said second laminate layer.

26. The composite insulation material according to claim 18, wherein said syntactic foam component has a thickness of between about 2 and about 25 millimeters.

27. The composite insulation material according to claim 18, wherein said composite insulation material has a thickness of between about 2 and about 25 millimeters.

28. The composite insulation material according to claim 1, wherein said composite insulation material has a thickness of between about 2 and about 25 millimeters.

29. The composite insulation material according to claim 1 wherein said composite insulation material has opposed first and second surfaces, the composite insulation material further comprising a plurality of incisions and/or

indentations formed into the first surface and/or the second surface, or extending between the first and second surfaces.

30. The composite insulation material according to claim 29, wherein said plurality of incisions and/or indentations are at a depth of between about 10 and about 100 percent of the thickness of said composite insulation material.

31. The composite insulation material according to claim 29, wherein each of said plurality of incisions and/or indentations has a width of not greater than about 25 times the thickness of said composite insulation material.

32. The composite insulation material according to claim 29, wherein said plurality of incisions and/or indentations comprise incisions and/or indentations of non-uniform depth and width.

33. The composite insulation material according to claim 29, wherein said plurality of incisions and/or indentations are arranged in a uniform array.

34. The composite insulation material according to claim 29, wherein said plurality of incisions and/or indentations are arranged in a non-uniform array.

35. The composite insulation material according to claim 29, wherein each of said plurality of incisions and/or indentations has the same shape.

36. The composite insulation material according to claim 29, wherein said plurality of incisions and/or indentations comprise at least two different shapes of incisions and/or indentations.

37. The composite insulation material according to claim 1, wherein said composite insulation material has a thermal conductivity of between about 10 and about 50 mW/m-K at a depth of up to about 350 feet of sea water.

38. The composite insulation material according to claim 1, wherein said composite insulation material has a drapeability parameter of between about 0.07 and about 3.36 g-m, as measured using Federal Test Method Standard Number 191A Method 5206.

39. The composite insulation material according to claim 1, wherein said composite insulation material has a tensile strength of between about 0.07 and about 2.20 MPa, as measured using ASTM D412-98a.

40. The composite insulation material according to claim 1, wherein said composite insulation material has a tear strength of between about 0.36 and about 17.60 kN/M, as measured using ASTM D624-00.

41. The composite insulation material according to claim 1, wherein said composite insulation material has an elastic modulus of between about 0.01 and about 0.22 MPa at an elongation of about 50 percent, between about 0.02 and about 0.25 MPa at about 100 percent elongation, or between about 0.02 and about 0.29 MPa at about 200 percent elongation, as measured using ASTM D412-98a.

42. The composite insulation material according to claim 1, wherein said composite insulation material has a specific weight of between about 0.25 and about 0.70.

43. The composite insulation material according to claim 1, wherein said composite insulation material has a density of between about 250 kg/m^3 and about 750 kg/m^3.

44. An article of clothing comprising the composite insulation material according to claim 1.

45. The article of clothing according to claim 45, wherein said article is a dive suit.

46. A pipeline comprising the composite insulation material according to claim 1.

47. A method of making a composite insulation material having opposed first and second surfaces, that includes a syntactic foam component and a plurality of aerogel inserts embedded within the syntactic foam component, said method comprising:

(i) providing a syntactic foam component, and

embedding a plurality of aerogel inserts within the syntactic foam component to form the composite insulation material; or

(ii) providing a syntactic foam component precursor,

inserting a plurality of aerogel inserts within the syntactic foam component precursor, and

curing the syntactic foam component precursor to form the composite insulation material.

48. The method according to claim 47 further comprising:

introducing a plurality of incisions and/or indentations into the first and/or second surfaces of the composite insulation material.

49. The method according to claim 48, wherein said introducing is carried out prior to said embedding.

50. The method according to claim 48, wherein said introducing is carried after said embedding or said curing.

51. The method according to claim 48, wherein said introducing is carried out manually.

52. The method according to claim 51, wherein said introducing comprises repeatedly pressing a cork borer into the first surface or the second surface of the composite insulation material.

53. The method according to claim 48, wherein said introducing is carried out automatically.

54. The method according to claim 53, wherein said introducing comprises exposing the first surface and/or the second surface of the composite insulation material to a calender.

55. The method according to claim 47, wherein said embedding comprises adding the aerogel inserts to the syntactic foam component under conditions effective to fully and/or partially embed the aerogel inserts within the syntactic foam component.

56. The method according to claim 48 further comprising applying first and second laminate layers onto the first and second surfaces of the composite insulation material, respectively.

57. The method according to claim 56 further comprising, prior to said applying:

depositing first and second adhesive layers onto the first and second surfaces of the composite insulation material, respectively.

58. The method according to claim 47 further comprising:

coating the first surface of the composite insulation material with a fluid impervious membrane.

59. The method according to claim 47 further comprising:

coating the second surface of the composite insulation material with a fluid impervious membrane.

60. A composite insulation material produced according to the method of claim 47.

61. A method for enhancing the flexibility of a solid material, said method comprising:

providing a solid material having opposed first and second surfaces; and

introducing a plurality of incisions and/or indentations into the first and/or second surfaces of the solid material, thereby enhancing the flexibility of the solid material.

62. The method according to claim 61, wherein the solid material is a homogenous or non-homogenous material.

63. The method according to claim 61, wherein the solid material is selected from the group consisting of acoustic insulation, electrical insulation, high strength-to-weight materials, and thermal insulation.

64. The method according to claim 61, wherein said introducing is carried out manually.

65. The method according to claim 64, wherein said introducing comprises repeatedly pressing a cork borer into the first and/or second surfaces of the solid material.

66. The method according to claim 64, wherein said introducing is carried out automatically.

67. The method according to claim 66, wherein said introducing comprises exposing the first and/or second surfaces of the solid material to a calender.

68. A flexible solid material produced according to the method of claim 61.